

Wavelength Stabilized High Brightness Direct Diode Pumps for Solid State LIDAR Systems at Eye-Safe Wavelengths, Phase II

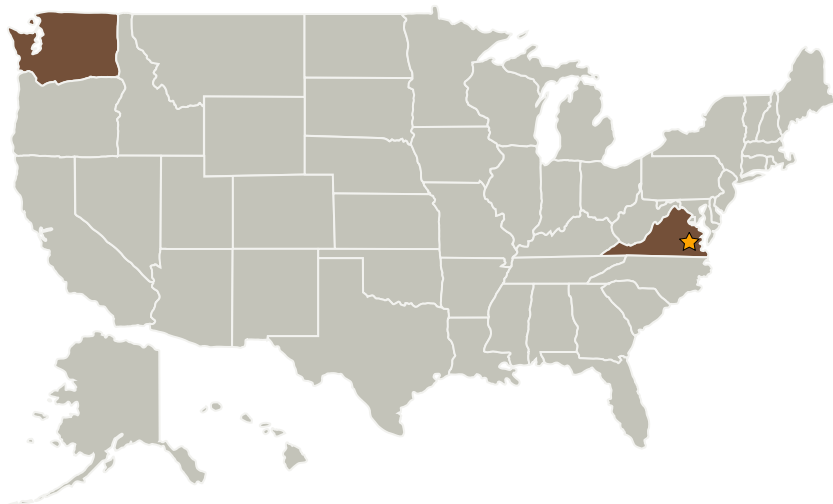
Completed Technology Project (2009 - 2011)



Project Introduction

Our proposed innovation is to design and fabricate a diode pumped Er:YAG micro-chip laser capable of varied repetition rates and high pulse energies using the single emitter-based high brightness pump developed in the Phase I. Future NASA missions will require high-pulse power with variable repetition rate flash and scanning LIDAR systems. Such LIDAR systems offer the advantages of excellent spatial resolution, high efficiency, and high beam quality. We propose to design and fabricate a resonantly pumped, passively Q-switched Er:YAG laser for eye-safe wavelength operation. We will incorporate the Er:YAG crystal and saturable absorber into the pump module, creating a compact, robust, and efficient Q-switched solid-state microchip laser. The development of long wavelength, high power, highly efficient, fiber coupled pump modules will be continued. The basic pump unit, known as Pearl, has already proven itself robust in rigorous environmental testing. The performance of these devices will be enhanced by the addition of volume Bragg gratings (VBGs) for improved temperature stability and narrowed spectral line width for enhanced pump absorption. The development of these fiber coupled pump modules will be of great use to NASA for the pumping of future Er:YAG and Er-doped fiber laser systems, enabling high pulse energy eye-safe LIDAR systems.

Primary U.S. Work Locations and Key Partners



Wavelength Stabilized High Brightness Direct Diode Pumps for Solid State LIDAR Systems at Eye-Safe Wavelengths, Phase II

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Areas	2

Wavelength Stabilized High Brightness Direct Diode Pumps for Solid State LIDAR Systems at Eye-Safe Wavelengths, Phase II

Completed Technology Project (2009 - 2011)



Organizations Performing Work	Role	Type	Location
★ Langley Research Center (LaRC)	Lead Organization	NASA Center	Hampton, Virginia
nLight Photonics Corporation	Supporting Organization	Industry	Vancouver, Washington

Primary U.S. Work Locations	
Virginia	Washington

Project Transitions

 **September 2009:** Project Start **September 2011:** Closed out

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.1 Cryogenic Systems
 - └ TX14.1.1 In-space Propellant Storage & Utilization